

# Emission Reduction Plan for Ports and Goods Movement in California



**Briefing for Port of San Diego Staff  
May 2, 2006**



**Air Resources Board**  
California Environmental Protection Agency

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## ■ **Need for Plan**

- Administration's Goods Movement Action Plan
- Community health and environmental justice
- ARB's Diesel Risk Reduction Plan
- Air quality standards and plans (SIPs)

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## ■ Key Emission Sources

- Heavy diesel trucks
- Locomotives
- Ships
- Harbor craft
- Cargo handling equipment



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## ■ Air Pollutants from Goods Movement

- Particulate matter (PM)
  - Diesel PM
  - Nitrates (NO<sub>x</sub>) and sulfates\* (SO<sub>x</sub>) that form particles
- Ozone
  - From NO<sub>x</sub> and reactive organics (ROG)

\*Not yet included in goods movement analyses

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## 2005 Health Impact, from Good, Movement

	<u>Cases/Year</u>
Premature death*	2,400
Hospital admissions (heart)	830
Hospital admissions (lung)	2,000
Acute bronchitis	5,100
Asthma/other respiratory	62,000
Absences/restricted days	4.4 million

*\*Uncertainty range is 720 to 4,100 deaths/year*

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## Ports—Increased Cancer Risk Ports of Los Angeles & Long Beach\*

Year 2002

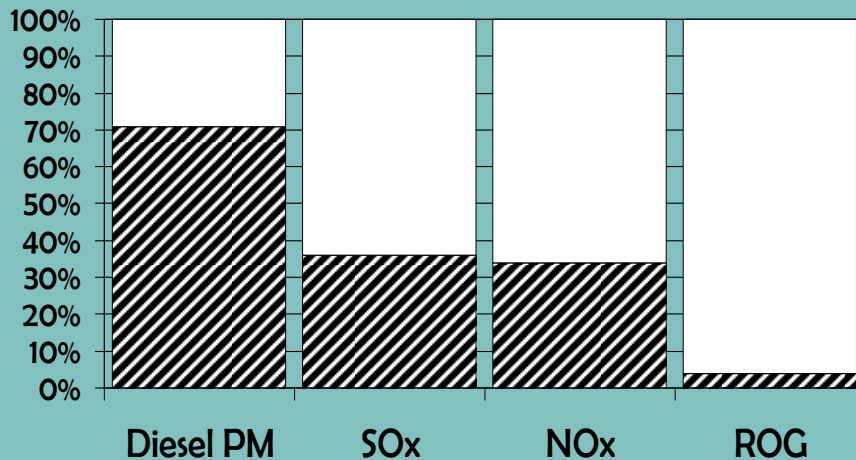


<u>Lifetime Risk (chances/million)</u>	<u>People impacted</u>
>500	50,000
>200	400,000
>100	1 million
>10	>2 million

*\*October 2005 Draft ARB Study*

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## Good\$ Movement Contribution to Statewide Emissions in 2005



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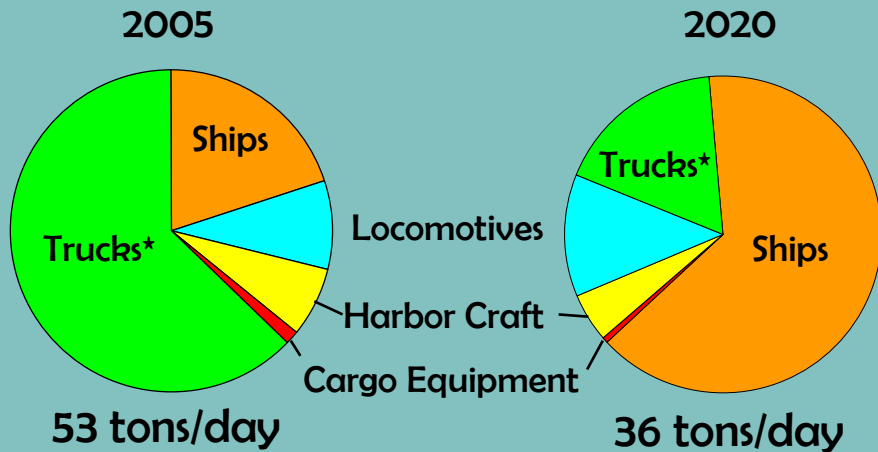
## Growth Projections 2001-2020

- Continued increase in international trade -- cargo through ports triples by 2020
- California population grows 25%
- Truck travel increases 50%
- Cargo carried on rail grows by 110%
- Emissions grow at a slower rate due to controls and efficiency improvements

All Plan numbers include growth

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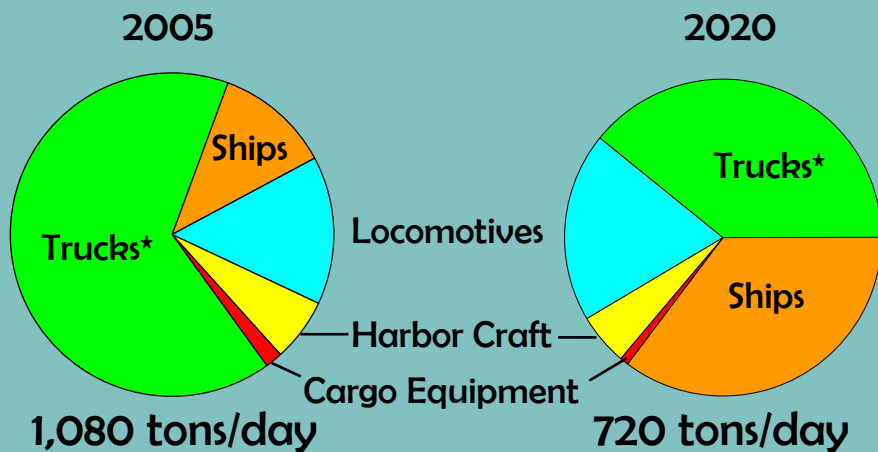
## ■ Diesel PM from Goods Movement



\* Includes TRUs

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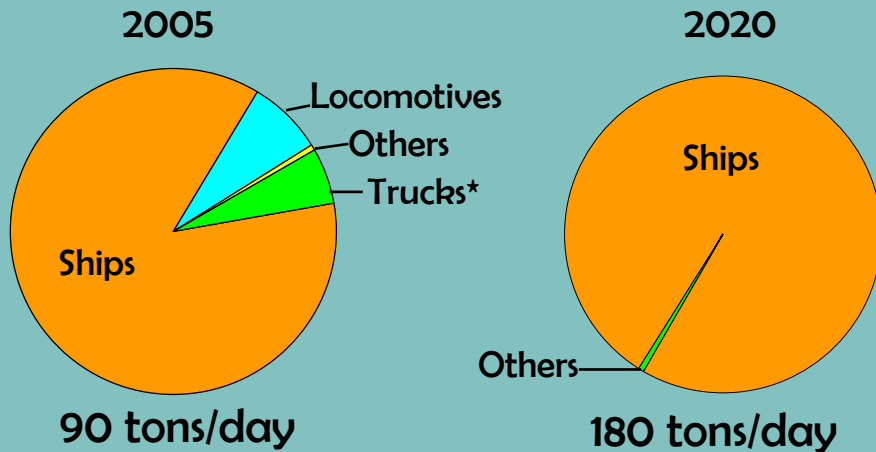
## ■ NO<sub>x</sub> from Goods Movement



\* Includes TRUs

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## ■ \$Ox from Goods Movement



\* Includes TRUs

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## ■ Goals for Goods Movement

### "No net increase"

1. By 2010, reduce statewide emissions to the greatest extent possible and at least back to 2001 levels

### Diesel PM risk

2. By 2020, reduce statewide risk 85%

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## ■ **Goal\$ for Good\$ Movement**

### Attainment of federal standards

3. Reduce South Coast NO<sub>x</sub> 30% in 2015 and 50% in 2020 (preliminary targets)
4. Apply strategies statewide to aid all regions in attaining standards

### Localized risk reduction

5. Reduce localized risk in communities adjacent to goods movement facilities

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## ■ **Regulation\$ and \$trategies**

- Regulatory actions are, and will remain, the framework for emission reductions
- Incentive programs are essential
- Leases, agreements, or trading are potential mechanisms



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## **Ships**

### **New Strategies**



- Cleaner new engines and fuels
- Add-on emission controls
- Operational changes
- Shore-based electrical power in port (aka, “cold ironing”)

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## **Ships In/Near Port**

- ✓ ARB rule for cleaner auxiliary engine fuel (Adopted December 2005)
- Strategy to cut dockside emissions
  - Use of plug-in shore power
  - Alternative at-dock technologies (like channeling exhaust through barge-mounted control devices)

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## ARB Report on Shore Power



“Evaluation of Cold-Ironing Ocean-Going Vessels at California Ports” (March 2006)

- Most cost-effective for passenger, container, and refrigerated cargo ships
- Prime candidate ports: LA, Long Beach, Oakland, San Diego, SF, Hueneme
- 2/3 of capital & benefits at LA/Long Beach

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## ■ Targets for At Dock Controls

- Plan seeks increasing percentage of ship visits to use shore power or alternatives

	Ship Visits by Year		
	2010	2015	2020
Shore Power	20%	60%	80%
Alternate Measures	20%	40%	20%

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## ■ Ships at Sea



- Cleaner propulsion engine fuel
- Retrofit controls for existing engines
- Bring cleaner ships to California service
  - Step 1: 30% lower NOx and PM emissions than existing standards, beginning 2010
  - Step 2: Best technology at 90% NOx and at least 60% PM control, beginning 2015

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## ■ Targets for Cleaner Ships

- Plan seeks increasing percentage of ship visits by vessels using cleaner technology

	Ship Visits by Year		
	2010	2015	2020
30% Lower Emissions	20%	50%	40%
Best Technology	--	25%	50%

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## **S~~O~~x Emission Control Area (SECA) or Alternative**

- Up to 45,000 ppm sulfur in ship fuel now
- A SECA caps fuel sulfur at 15,000 ppm
- ARB doing extensive SECA analyses
  - Need 5,000 ppm sulfur or less by 2015
- May not go far enough or fast enough
- Alternative is ARB rulemaking for CA only

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## **Harbor Craft New Strategies**

- ARB fleet rule for existing engines (underway)
- Shore-based electrical power in port
- Tighter U.S. EPA emission standards for new engines (or ARB adoption)



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## **Trucks**

### **New Strategies**



- Port “drayage” truck modernization program
- ARB rule for privately-owned truck fleets (underway)
- Enhanced enforcement of truck idling limits in communities
- ✓ ARB rule for international trucks (Adopted January 2006)

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## **ARB Report on Port Truck Modernization**

- “Evaluation of Port Trucks and Possible Mitigation Strategies” (April 2006)
- Basic elements in plan
  - Incentives to replace oldest trucks and retrofit controls on the rest
  - ARB rule to push owners to incentives
  - Ports as gatekeepers for clean fleet

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## **Rail Yard Locomotives New Strategies**



- Upgrade switcher/local yard locomotives
  - Multiple off-road engines (gen-sets)
  - Diesel-electric engines (Green Goats)
  - Alternative fuels

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## **Long-Haul Locomotives New Strategies**



- National Tier 3 locomotive standards
  - 90%+ PM and NOx control on new engines, cleaner rebuilds, diagnostics, anti-idling
- Tier 3 locomotives brought to California service

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## **Cargo Equipment** New Strategies

- ✓ ARB rule for new and existing equipment  
(Adopted December 2005)
- 85% PM control on all engines



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## **2006-2007 Pending US EPA Rulemaking & Actions**

- Advanced technology standards for NOx/PM
  - New and rebuilt locomotives
  - Auxiliary/main engines on ships in US waters
  - New harbor craft engines
- SOx Emission Control Area for West Coast of North America

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## ■ **Partnerships Critical to Success**

- Ports and shippers
- Railroads
- Truckers
- Air districts
- Local governments and communities
- US EPA/federal government

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## ■ **Plan Meets Goals**

- ✓ Goes further than no net increase by 2010, bringing emissions 20-40% below 2001 levels
- ✓ Reduces diesel PM risk 85% by 2020
- ✓ Achieves preliminary South Coast SIP targets for 2015 and 2020
- ✓ Achieves substantial reductions in South Coast, SJ Valley, Bay Area, San Diego, & Sacramento

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## ■ **Plan Benefits, Public Health**

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- By 2020, over 1,500 premature deaths would be avoided
- Corresponding reduction in:
  - Hospitalizations for heart & lung disease
  - Asthma
  - Acute bronchitis
  - Absences from school or work

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## ■ **Cumulative Costs and Benefits**

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- Cumulative cost to implement plan strategies (2006-2020): \$6 to \$10 billion
- Goods movement contributes more than \$200 billion/year to California's economy
- Plan provides \$3-8 in benefits for each \$1 spent on controls

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## ■ **Board Action on April 20, 2006**

### Approved:

- Plan goals
- Overall strategy
- Near-term action items

### Directed staff to:

- Expeditiously pursue rules and other actions
- Initiate public process to cut localized risk
- Report back in November

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## ■ **Near-Term Actions:** Initiate ARB Rulemaking/Effective Alternatives in 2006

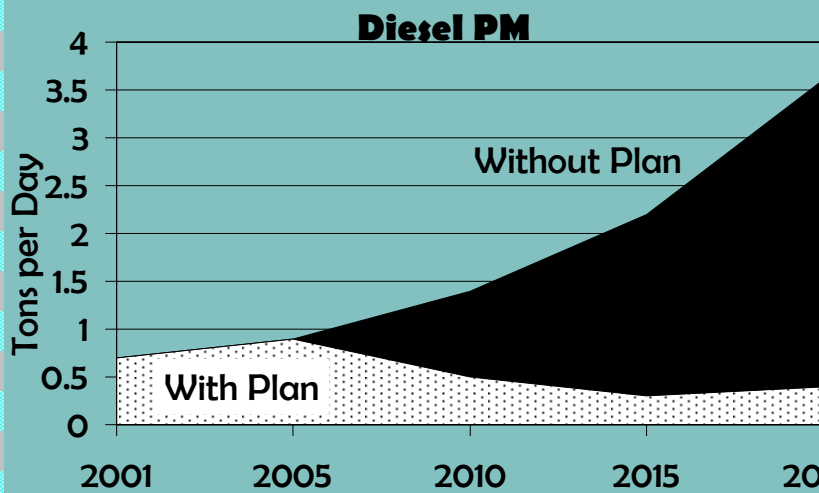
- Port trucks
- Privately-owned truck fleets
- Low sulfur marine propulsion engine fuel
- Shore power for ships and harbor craft
- Harbor craft fleets
- New harbor craft engine standards
- Upgrade switcher/yard locomotives
- Bring cleaner ships to California

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## San Diego County

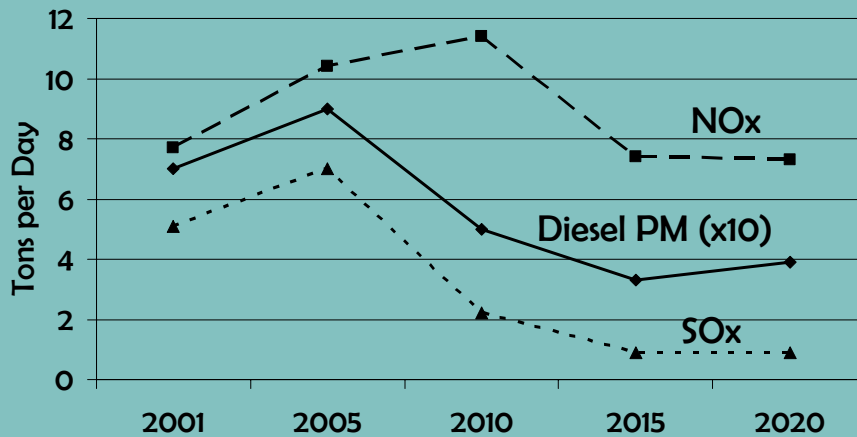
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## San Diego - Plan Impact on Ships 2001-2020



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## San Diego - Ship Emissions with Plan Strategies



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## San Diego - Goods Movement Emission Reductions with Plan

	Percent Reduction <u>2001-2020</u>
SOx	83%
Diesel PM	71%
NOx	46%
ROG	43%

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## **San Diego – Health Benefits of Plan**

Estimated premature deaths in San Diego County attributed to emissions from goods movement:

- 150 premature deaths from current emissions
- Increases to 200 by year 2020, with growth and no new controls
- Plan strategies would avoid 120 in year 2020

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## **Localized Impacts**

- Plan reduces, but doesn't eliminate, localized health risk
- ARB will initiate a public process to identify additional strategies to address
- Land use decisions matter
- Staff will continue advising local land use decision makers



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